

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : HITACHI LTD

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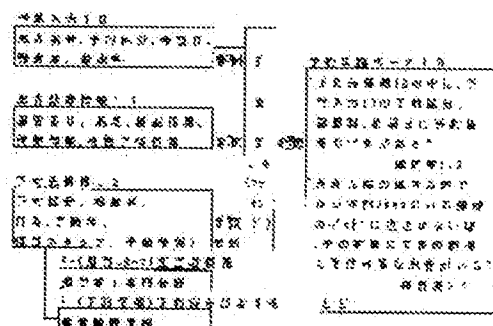
(72)Inventor : TAMEKUNI YUICHI

## (54) GENERAL RESERVATION SYSTEM FOR HOSPITAL

(57)Abstract:

PURPOSE: To make the optimum reservation for medical examination and treatment taking into consideration sections having the optimum staffs and the degree of emergency based on the consultation information in making various reservations in the hospital.

CONSTITUTION: An inference section 14 makes the reservation automatically by performing the inference while referring to a knowledge database 13 with the knowledge of the optimum arrangement method registered based on the inputted reservation information 10, consultation information 11 and information 12 on the reservation destination section. Thus, doctors and nurses who intend to make a reservation can perform the optimum reservation for medical examination and treatment with a simple operation. Making a reservation form and a contact by phone in case of an emergent patient can be made unnecessary.



## LEGAL STATUS

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decision of rejection]

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CLAIMS

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[Claim(s)]

[Claim 1] The comprehensive reservation method for hospitals characterized by to fulfill various medical-examination reservation by reasoning based on the knowledge base which registered the optimal configuration method by the information on the section which has the optimal staff for the medical examination, and a reservation patient's urgency etc. based on a patient's medical-examination information in the comprehensive reservation method for hospitals constituted by having an I/O device, data storage equipment, and a central processing unit.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the electronic chart system in a hospital, an order system, and a reservation system, and relates to the comprehensive reservation method for hospitals which optimizes reservation automatically especially.

[0002]

[Description of the Prior Art] Conventionally, various things are developed as a reservation system in a hospital, and it is produced commercially. Even inside "the technique proposed by re-examination, and a design and employment (the 9th medical informatics union convention 2-C-52 (9th JCMF Feb.1990)) of an inspection reservation system is user-friendly, and is the fully examined system.

[0003] If a reservation frame is prepared in the period unit which reserves and which exists for every section, the flag is set from the frame which is vacant with \*\*\*\*\* in reservation and a frame fills, this system will make reservation beyond it impossible, and will reserve the next period.

[0004]

[Problem(s) to be Solved by the Invention] Said conventional technique sets up the reservation frame fewer than the maximum frame which can receive the medical-examination section the sake [ when an urgent patient enters ], and has the trouble that the receptionist to an urgent patient must be considered as ledger reception by a telephone etc.

[0005] Moreover, when grasping and reserving where there is any special medical-examination staff [ as opposed to a patient's condition of disease in the medical practitioner and nurse who want to reserve ] as for said conventional technique, it has the trouble that it is necessary to reserve by inputting such information.

[0006] When reserving, the purpose of this invention is easy alter operation, and is to offer the comprehensive reservation method for hospitals which can perform optimal reservation which also considered the urgency.

[0007]

[Means for Solving the Problem] according to this invention -- said purpose -- reservation (physiology inspection a next medical examination --) of various medical examination a patient's medical-examination information (the name of a disease --) registered into the computer system when performing hospitalization etc. The information on the section which has the optimal staff (a medical practitioner, a nurse, laboratory technician, etc.) for the medical examination based on inspection etc., The optimal configuration method by a reservation patient's urgency etc. is registered as the knowledge base, and it reasons based on this registered knowledge base, and is attained by attaining optimization of patient reservation.

[0008]

[Function] It becomes that the medical practitioner who wants to reserve only by registering the knowledge of the expert who was performing the optimal arrangement of reservation according to this invention, and a nurse can perform optimal reservation by performing easy actuation of inputting information, such as a patient name, reservation partitions (a next medical examination, physiology inspection, hospitalization, etc.) performing, an urgency, and a day wishing reservation. Moreover, need, such as reservation ledger entry for an urgent patient and telephone contact, can be abolished.

[0009]

[Example] Hereafter, a drawing explains one example of the comprehensive reservation method in the hospital by this invention to a detail.

[0010] The block diagram in which drawing 1 shows the system configuration of one example of this invention, drawing where drawing 2 explains the outline of actuation of one example of this invention, and drawing 3 are the

flow charts explaining actuation of one example of this invention. For medical-examination information preservation equipment and 3, as for a workstation and 5, in drawing 1, a file server and 4 are [ 1 / a host computer and 2 / Base LAN and 6 ] Floors LAN.

[0011] the system by one example of this invention is shown in drawing 1 -- as -- a patient's medical-examination information (the name of a disease ---) The host computer 1 which realizes an electronic chart system with inspection etc., an order system, and a medical-affairs accounting system, the data storage equipment 2 which keeps medical-examination information, each clinic, It has the workstation 4 which the medical practitioner of a ward, the file server equipment 3 which keeps data temporarily for every laboratory, each clinic, a ward, and a laboratory, a nurse, a laboratory technician, etc. use, the base LAN 5 which connects these, and a floor LAN 6, and is constituted.

[0012] The program which realizes the reservation method by one example of this invention may be arranged to any of a host computer 1, file server equipment 3, or a workstation 4.

[0013] Next, according to the flow chart shown in drawing 3, actuation of one example of this invention constituted as mentioned above is explained, referring to the schematic diagram of drawing 2 of operation.

[0014] (1) A host computer 1 acquires the reservation input 10. The reservation input 10 inputted from the workstation 4 is information, such as a patient number which the medical practitioner who wants to reserve, the nurse, etc. inputted, reservation partitions (a next medical examination, physiology inspection, hospitalization, etc.) to perform, an urgency (information on being whether hospitalization or inspection must be carried out immediately, and the hospitalization and inspection which do not need to be hurried so much etc.), and a day wishing reservation, (step 100).

[0015] (2) Retrieve and acquire the medical-examination information 11 (the name of a disease, inspection information, medication information, treatment operation information) of the patient in file server equipment 3 from a system (an electronic chart, order, medical-affairs accounting) based on the patient number in the reservation input 10 (step 110).

[0016] (3) Although a patient's medical-examination information is always stored in medical-examination information preservation equipment 2, in case it treats a patient, download it to file server equipment 3. When not specifying this medical-examination information 11, the reservation partition of the reservation input 10, and the day wishing the day [reservation wishing reservation, based on setting], the reservation place information 12 in file server equipment 3 is retrieved, and that day (system date) that carried out the reservation input is acquired. This search is performed considering the staff in charge who can cope with the name of a disease of the reservation partition of the reservation input 10, the day wishing reservation, and the medical-examination information 11 as a key (step 120).

[0017] If reserved, the reservation information which shows [ a reservation partition a clinical division, the staff in charge, time, the reservation frame in which the reservation is possible and the information on whether to be reserved in the reservation frame, and ] which patient is reserved is registered into the reservation place information 12. On the other hand, the numeric values 0.0-1.0 of reliability when knowledge (Ruhr) and the Ruhr of the expert who was performing reservation management by handcraft until now are materialized are registered into the reservation knowledge base 13. This reservation knowledge base 13 is stored in file server equipment 3.

[0018] Moreover, it will be said that it makes a numeric value the degree of a probability that it is better to carry out reservation by the Ruhr, and it is so probable that the above-mentioned reliability has a numeric value close to 1.0 when the Ruhr is materialized. There are especially no setting criteria of this reliability, they compare two or more Ruhr with an expert's Ruhr creation time, and set them up from those probabilities. For example, if the Ruhr is "the opening of reservation information is in the reservation place information 12 on the reservation partition of the reservation input 10, a clinical division, and the day of choice", it will register with reliability 1.0 grade and the reservation knowledge base 13.

[0019] (4) The inference section 14 performs reservation inference based on the knowledge of the knowledge base 13 after termination of step 120, referring to the input 10 acquired by the above-mentioned, the patient medical-examination information 11, and the reservation place information 12. This inference is performed so that reliability when the Ruhr registered into the reservation knowledge base 13 is materialized may end inference there, when the Ruhr of 1.0 appears (steps 130 and 140).

[0020] (5) When there was the Ruhr where reliability does not become 1.0, the reliability is memorized for every Ruhr and all the Ruhr was completed by processing of step 130, tell reservation input origin about the result of the Ruhr materialized in the high order of reliability. Since performing all the Ruhr at this time may take time amount, inference is ended when it amounts to n pieces the number of the materialized Ruhr is beforehand decided to be

(step 150).

[0021] (6) An input person chooses what is considered to be the optimal from the inside as a result of inference, and answers to a system (step 160).

[0022] (7) A system registers that reservation was carried out to the reservation place information 12 based on this reply (step 170).

[0023] (8) Moreover, while telling reservation input origin about reservation having been performed, output the reservation vote to a patient (step 180).

[0024] (9) When it confirms whether reservation migration of other patients, ward migration, etc. occurred with the above-mentioned reservation at this time and the above-mentioned migration etc. has occurred, means, such as a message output to a workstation 2, a ticket output, and an electronic mail, notify those contents to their relation post in a hospital (step 190).

[0025] In the above, although a series of actuation to an output was explained the result from the reservation input by the example of this invention next, while a concrete example is shown, actuation to an output is explained a result from a reservation input.

[0026] Although the need for hospitalization of the patient who came by the outpatient department in instance is in the 1st internal medicine now, it shall reserve in the condition that it is vacant in the ward of the 1st internal medicine, and there is no bed.

[0027] The reservation input 10 is made into the following contents, and is inputted from a workstation 4.

[0028] Patient number 1234 reservation partitions 01 (hospitalization)

Day of choice Abbreviation (that day)

Urgency 1 (urgent)

Clinical division 01 (the 1st internal medicine)

The patient medical-examination information 11 is retrieved for the patient number of the reservation input 10 from file server equipment 3 to a key. Retrieved information is carried out as follows.

[0029] Patient number The 1234 name of a diseases Nothing inspection information Nothing medication information Nothing treatment operation information Based on such information, the nothing inference section 14 uses the knowledge base 13, and performs inference as follows.

[0030] It reasons according to the 1st Ruhr of introduction and the reservation knowledge base 13.

[0031] "which has the opening of reservation information in the 1st Ruhr" reservation place information 12 on the reservation partition of the reservation input 10, a clinical division, and the day of choice is performed.

[0032] At this time, the reservation place information 12 retrieved presupposes that it is as follows.

[0033] Reservation partition 01 (hospitalization)

Clinical division 01 (the 1st internal medicine)

Time Reservation frame on the day 6 The staff in charge A medical practitioner (digestive organ), B medical practitioner (digestive organ), C medical practitioner (digestive organ) D medical practitioner (general internal medicine)

F head nurse (general internal medicine treatment), G chief (ICU, CCU) H chief (general internal medicine treatment)

Reservation information Bed No.1 1 (0001) Bed No.4 1 (0011)

Bed No.2 1 (0002) Bed No.5 1 (0005)

Bed No.3 1 (0008) Bed No.6 1 (0009)

1 shows a patient number in reserved and a parenthesis.

[0034] In this, since there is no opening of reservation information, the next reservation knowledge base is reasoned.

[0035] the time of the patient of the 2nd Ruhr" direct hospital admission of emergency -- or [ and / that a patient movable to other wards is in the ward when there is no opening in the ward of hope ] -- "

[0036] Based on this Ruhr, it searches whether a movable patient is in other wards. This retrieval is performed based on the reservation information within the reservation place information retrieved in the 1st Ruhr. Since a patient number is in reservation information, patient medical-examination information is retrieved for this patient number to a key, and a movable patient is discovered. The inference section 14 also performs retrieval of a movable patient. As the Ruhr used in order to perform this inference, the following Ruhr is registered along with the 2nd Ruhr in the reservation knowledge base 13.

[0037] That is, it is "movable [ the patient who is carrying out neither operation nor big treatment in the less than two weeks of past ]", movable [ "movable / the patient whom the therapy of only medication or injection follows

one week or more /" ], movable [ "movable / the leaving hospital scheduled day / the patient for less than one week /" ], etc.

[0038] If a movable patient becomes clear as a result of inference according to these Ruhr, it will search whether there is any acceptance ward of this patient. This retrieval is physically performed to a current ward from a near ward. If the Ruhr mentioned above by these retrieval is materialized, 0.9 will be set up as reliability.

[0039] As it mentioned above, when the Ruhr in the reservation knowledge base is performed and the Ruhr is materialized n times, the result is outputted to the operator of a workstation 4 as a message.

[0040] An outgoing message is outputted as follows at the high order of reliability.

Formation No. The formation Ruhr Reliability 01 A patient 0005 is moved to the ward of the 2nd internal medicine. The patient of 1234 is hospitalized in bed No.1. 0.9 02 - The operator of - workstation decides which Ruhr to adopt finally from the displayed contents, and inputs the number. The file of the reservation place information 12 is updated according to this inputted Ruhr, and reservation processing is carried out. Moreover, with this reservation processing, the ticket of \*\*\*\*\* is outputted to an acceptance place ward, and a reservation vote is outputted to an input person.

[0041] It enables the medical practitioner who wants to reserve, and a nurse to perform optimal reservation by easy actuation of inputting information, such as reservation partitions (a next medical examination, physiology inspection, hospitalization, etc.) performing, an urgency, and a day wishing reservation, as a patient name, only by registering the knowledge of the expert who was taking charge of the reservation in a hospital according to the example of this invention mentioned above. Moreover, the need of performing reservation ledger entry, telephone contact, etc. for an urgent patient can also be abolished.

[0042]

[Effect of the Invention] As explained above, when reserving medical examination etc. according to this invention, optimal reservation which also considered the urgency can be performed by easy alter operation.

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TECHNICAL FIELD

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PRIOR ART

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

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OPERATION

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EXAMPLE

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[0012] The program which realizes the reservation method by one example of this invention may be arranged to any of a host computer 1, file server equipment 3, or a workstation 4.

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[0016] (3) Although a patient's medical-examination information is always stored in medical-examination information preservation equipment 2, in case it treats a patient, download it to file server equipment 3. When not specifying this medical-examination information 11, the reservation partition of the reservation input 10, and the day wishing the day [reservation wishing reservation, based on setting], the reservation place information 12 in file server equipment 3 is retrieved, and that day (system date) that carried out the reservation input is acquired. This search is performed considering the staff in charge who can cope with the name of a disease of the reservation partition of the reservation input 10, the day wishing reservation, and the medical-examination information 11 as a key (step 120).

[0017] If reserved, the reservation information which shows [ a reservation partition a clinical division, the staff in charge, time, the reservation frame in which the reservation is possible and the information on whether to be reserved in the reservation frame, and ] which patient is reserved is registered into the reservation place information 12. On the other hand, the numeric values 0.0-1.0 of reliability when knowledge (Ruhr) and the Ruhr of the expert who was performing reservation management by handicraft until now are materialized are registered into the reservation knowledge base 13. This reservation knowledge base 13 is stored in file server equipment 3.

[0018] Moreover, it will be said that it makes a numeric value the degree of a probability that it is better to carry out reservation by the Ruhr, and it is so probable that the above-mentioned reliability has a numeric value close to 1.0 when the Ruhr is materialized. There are especially no setting criteria of this reliability, they compare two or more Ruhr with an expert's Ruhr creation time, and set them up from those probabilities. For example, if the Ruhr is "the opening of reservation information is in the reservation place information 12 on the reservation partition of the reservation input 10, a clinical division, and the day of choice", it will register with reliability 1.0 grade and the reservation knowledge base 13.

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[0020] (5) When there was the Ruhr where reliability does not become 1.0, the reliability is memorized for every Ruhr and all the Ruhr was completed by processing of step 130, tell reservation input origin about the result of the Ruhr materialized in the high order of reliability. Since performing all the Ruhr at this time may take time amount, inference is ended when it amounts to n pieces the number of the materialized Ruhr is beforehand decided to be (step 150).

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Clinical division 01 (the 1st internal medicine)

Time Reservation frame on the day 6 The staff in charge A medical practitioner (digestive organ), B medical practitioner (digestive organ), C medical practitioner (digestive organ) D medical practitioner (general internal medicine)

F head nurse (general internal medicine treatment), G chief (ICU, CCU) H chief (general internal medicine treatment)

Reservation information Bed No.1 1 (0001) Bed No.4 1 (0011)

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[0036] Based on this Ruhr, it searches whether a movable patient is in other wards. This retrieval is performed based on the reservation information within the reservation place information retrieved in the 1st Ruhr. Since a patient number is in reservation information, patient medical-examination information is retrieved for this patient number to a key, and a movable patient is discovered. The inference section 14 also performs retrieval of a movable patient. As the Ruhr used in order to perform this inference, the following Ruhr is registered along with the 2nd Ruhr in the reservation knowledge base 13.

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[0040] An outgoing message is outputted as follows at the high order of reliability.

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[0041] It enables the medical practitioner who wants to reserve, and a nurse to perform optimal reservation by easy actuation of inputting information, such as reservation partitions (a next medical examination, physiology inspection, hospitalization, etc.) performing, an urgency, and a day wishing reservation, as a patient name, only by registering the knowledge of the expert who was taking charge of the reservation in a hospital according to the example of this invention mentioned above. Moreover, the need of performing reservation ledger entry, telephone contact, etc. for an urgent patient can also be abolished.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the system configuration of one example of this invention.

[Drawing 2] It is drawing explaining the outline of actuation of one example of this invention.

[Drawing 3] It is a flow chart explaining actuation of one example of this invention.

[Description of Notations]

- 1 Host Computer
- 2 Medical-Examination Information Preservation Equipment
- 3 File Server Equipment
- 4 Workstation
- 5 Base LAN
- 6 Floor LAN
- 10 Reservation Input
- 11 Medical-Examination Information
- 12 Reservation Place Information
- 13 Reservation Knowledge Base
- 14 Inference Section

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[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

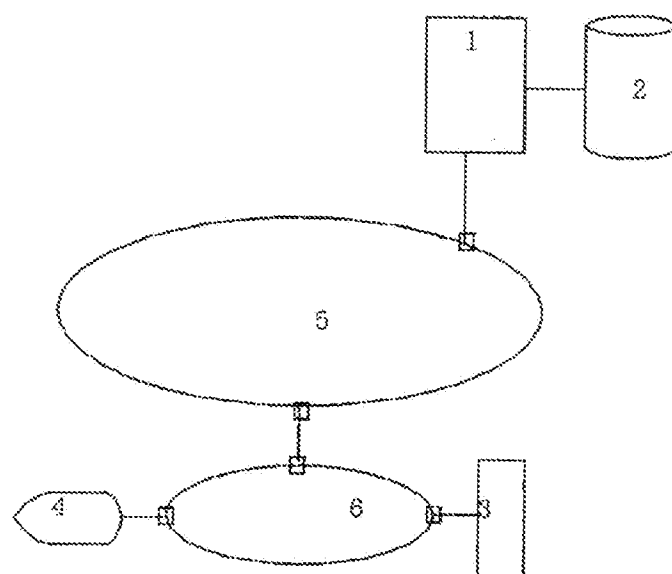
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DRAWINGS

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[Drawing 1]

[ 図 1 ]



1 … ホストコンピュータ

2 … 診療情報保存装置

3 … ファイルサーバ

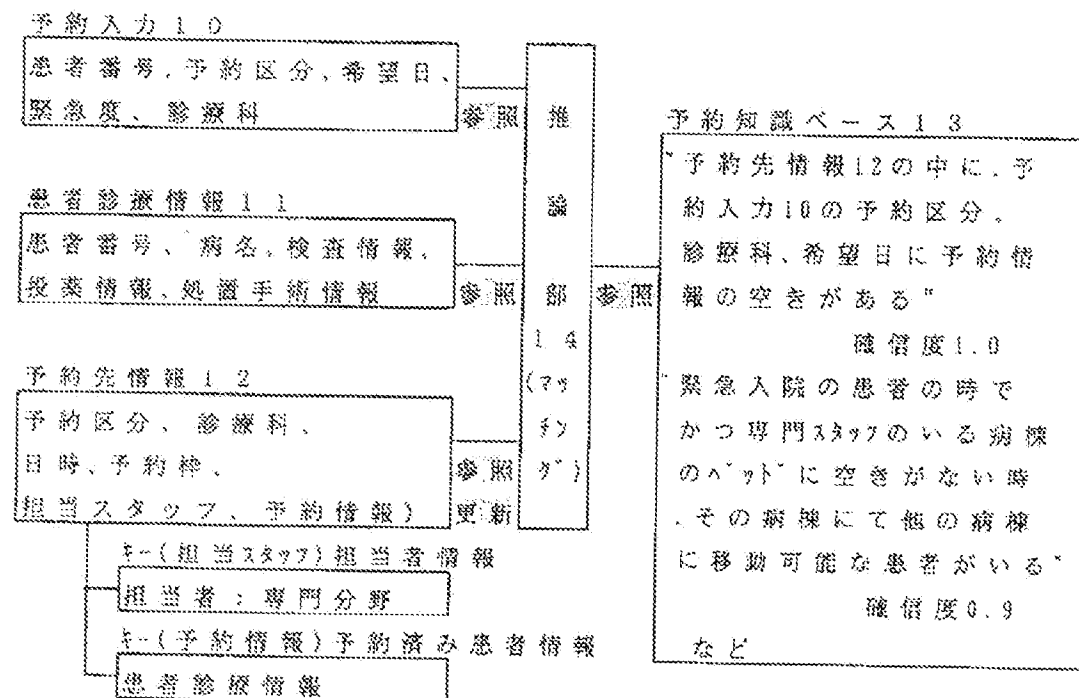
4 … ワークステーション

5 … 基幹LAN

6 … フロアLAN

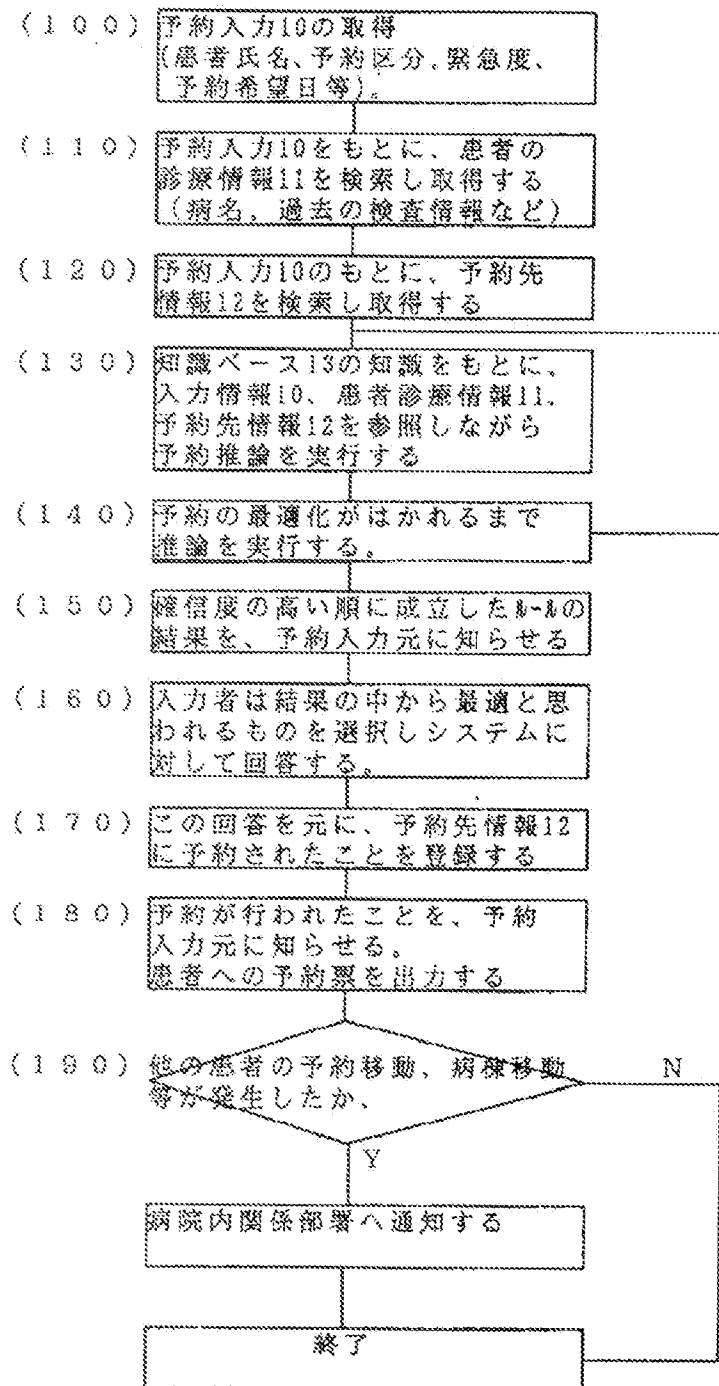
[Drawing 2]

【 図 2 】



[Drawing 3]

## 【 図 3 】



[Translation done.]